Animal Welfare Information Center Newsletter

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Legislation Update

- **H.R. 2407 Entitled the "Farm Animal and Research Facilities Protection Act of 1991."**

Introduced May 20, 1991, by Charles Stenholm (D-TX), and referred to the Committee on Agriculture. Prohibited acts: stealing or causing intentional loss of animals; breaking and entering any animal facility; receiving or having knowledge of any stolen materials; or obtaining unauthorized access to any animal facility with the intent to obtain animals, records or data, or destroy materials. Related bill: S. 544, "Animal Research Facilities Protection Act of 1991."

- **H.J.Res. 254 To designate the week beginning June 9, 1991, as "Animal Rights Awareness Week."**

Introduced May 14, 1991, by Frank Pallone (D-NJ), and referred to the Committee on Post Office and Civil Service. Congress designated the week of June 9, 1991, as "Animal Rights Awareness Week" to increase public awareness of animal suffering and promote humane treatment and respect for animals. Companion bill: S.J.Res. 152.

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ALSO IN THIS ISSUE...

The Alternatives Concept

by
Andrew Rowan, D.Phil.
Tufts University School of Veterinary Medicine
Center for Animals and Public Policy

The growth of scientific interest in the topic of alternatives has been marked by legislative initiatives and campaigns by animal advocates against animal testing. However, the topic is also marked by rhetoric that has served to confuse the public and others who have to deal with the subject because of legislative or regulatory mandate.

The public basically agrees with the argument that animal research is necessary [according to most polls, about 75 percent accept the practice (1)] but many are not entirely comfortable with the fact that their health is dependent on a practice that often causes death and possible distress of animals. Thus, the public comfortably supports the use of animals in research and medicine when there is a direct benefit for a human and little or no apparent distress caused to an animal. However, when there is apparently much distress and no immediate and obvious benefit to humans, public opposition is relatively easily mobilized.

Discomfort over the need to use animals in research and testing may also be observed among many who work in the laboratory (2,3). When I have specifically asked whether or not a scientist would use an animal if he or she did not need to, nearly all state that they would not. Current legislative mandates and organizational policy statements also imply this premise and urge scientists to use as few animals as possible and then only when necessary.

Some abolitionists believe that all animal research should stop today while others are willing to be more pragmatic. Most animal welfare supporters would like to see the end of animal use in research but do not perceive this to be a realistic or practical goal at the moment. Instead, they believe that the research establishment should devote more time

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Editor's Corner

This edition of the AWIC newsletter focuses on the concept of alternatives in research, testing, and education. A diversity of opinion and definition exists on this topic ranging from the purely political to the practical. Our featured authors have had considerable experience in dealing with this controversial subject in a theoretical and applied sense.

Since the passing of the 1985 amendments of the Animal Welfare Act (AWA), institutional animal care and use committees, primary investigators ,and information specialists have been faced with providing a "working" definition of alternatives that will meet AWA compliance standards. Dr. Andrew Rowan of the Tufts University School of Veterinary Medicine's Center for Animals and Public Policy reviews

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Editor's Corner Cont'd...
the concept of alternatives and provides a unique viewpoint from several different perspectives.

The interest and development of "alternative" methods and programs for teaching in the biological sciences and medical and veterinary schools are increasing. Computer simulations and alternative curricula are being tested in some classroom programs. Nils Soren Peterson will provide insight into the development and use of computer software programs in biological science education. Since 1984, he has been owner and chief software designer for From the Heart Software, a firm specializing in biology educational software. Peterson is the co-director of Project BioQuest, a national consortium of faculty and software developers creating materials for the general biology laboratory.

Dr. Franklin Loew, Dean of the Tufts School of Veterinary Medicine, provides a brief overview of the use of animals and alternatives in veterinary medical schools. Tufts is one of the first veterinary colleges in the United States to initiate an alternative program for surgery for third-year veterinary students.

In the previous newsletter the first AWIC workshop on alternatives was announced. Unfortunately, unpredicted circumstances delayed the printing and mailing of the newsletter. By the time the newsletter had reached our readers the class was over. We apologize for the inconvenience and hope that you will consider calling us and indicating your level of interest in attending a workshop or having us come to your institution (see page# 5).

Alternatives Cont'd...

and money to finding ways to eliminate animal pain and distress in research techniques (*i.e.*, the three R's--Reduction, Refinement, and Replacement). While supporting the concept of alternatives in principle, the average scientist still seems to be confused over what should be done to develop and promote these techniques more aggressively, and over how they should meet the new regulatory requirement to search the information base for possible alternatives. Then, there are some scientists who mistakenly see the term "alternatives" as a plot by <u>all</u> animal activists to stop <u>all</u> animal research.

If we are to develop an effective debate on the public policy aspects of animal research and alternatives, we should focus not on the question of whether animals should be used at all (although this is a legitimate issue albeit supported by only a small proportion of the public), but on how we might reduce both animal distress and the number of animals used in the laboratory. The concept of alternatives to animal use and the appropriate level of government effort to develop and promote the concept are key elements in such a debate.

The concept of alternatives is relatively simple and was first enunciated in 1959 by two British scientists who argued that animal researchers should always follow the principle of the "Three R's"--Replacement, Reduction and Refinement (4).

Replacement refers to situations where non-animal techniques may be substituted for techniques using research animals. There are a number of examples of such replacement in the diagnosis of disease and in the testing and standardization of biological therapeutic agents. Rabbits are no longer used in pregnancy tests. Using mice to test the potency of batches of yellow-fever vaccine was long ago replaced by a cell culture test. We may be close to eliminating the use of mice in insulin-standardization procedures as a result of a variety of technical advances.

Reduction refers to cases where the number of animals required for a particular activity or project can be reduced. One example of recent progress comes from the field of acute toxicity testing. Most toxicologists now agree that it is not necessary to use from 60 to 200 rodents to generate the statistically precise lethal dose. One can obtain perfectly adequate lethal-dose data using no more than 10 to 20 animals (5,6).

Another spectacular example of a reduction in animal use comes from the National Cancer Institute's (NCI) drug research and development program. A few years ago, NCI was reportedly using as many as 4.5 million rodents a year to screen chemicals for anti-tumor activity. However, the standard animal model system was far from ideal. After much argument and debate, NCI switched to the use of cell culture screening systems using human cancer cell lines. The program now uses between 500,000 and 1 million mice, an 80- to 90-percent reduction in animal use. It should be noted that the decision to switch was made for <u>scientific</u> rather than animal welfare reasons, illustrating the point that the pursuit of alternatives is not, in and of itself, anti-science.

Refinement is a very neglected aspect of the alternatives concept. It refers to the modification of a technique to reduce the pain and distress experienced by research animals. For example, various jacket and tether systems have been developed to protect catheters inserted into research animals which then allow an investigator to administer doses of test chemicals and take blood samples from an animal without having to restrain it. Capture and restraint often cause significant distress to an animal, so the use of the jacket and tether constitutes a real refinement.

The reduction of pain and/or distress is a popular topic now because Institutional Animal Care and Use Committees (IACUC's) at research institutions are deciding how to respond to the new regulations from the U.S. Department of Agriculture (7) and the guidelines from the National Institutes of Health (8). Principle investigators are now required to minimize animal pain and distress in their research projects (7). In their discussions, the committees should recognize that alternatives are nothing more than new techniques that should help scientists do their job more efficiently and effectively.

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Education, Computer Software and Animal Welfare

by
Nils Soren Peterson
From the Heart Software
Monmouth, Oregon

A clear educational philosophy and defined objectives are prerequisites to any discussion of the potential of computer software in education and its impact on animal welfare. This article starts with an educational philosophy where learners are actively engaged in "constructing" knowledge. The emphasis is as much on the process as on the content. Learners are viewed as responsible participants who must be engaged by the process, not treated as empty vessels into which knowledge is poured.

There have been attempts to study medical school curricula by counting the number of facts that students were expected to learn. As a measure of curricular complexity, counting facts is not too useful. How much knowledge does one fact encompass? What's the utility of knowing some facts without others, or without knowing their interrelations? Also, knowledge in the biomedical sciences is changing rapidly; some "facts" will become "false" when better theories are developed. All of these problems challenge the utility of teaching based primarily on information content. Medical schools are recognizing this problem and beginning to look for ways in which students can gain critical thinking skills and the ability to locate and understand new information when they need it throughout their lives. Proponents of teaching critical thinking skills recognize that "coverage" of content will be reduced in favor of a deeper understanding of science as a process of constructing knowledge.

Project BioQUEST, a consortium creating a general biology curriculum using software, has coined the phrase "3P's" to describe a teaching philosophy. For BioQUEST the 3P's are analogous to the 3R's of basic education (reading, 'riting, and 'rithmetic). They constitute the core of any scientific education. BioQUEST's 3P's (Problem-posing, Problem-solving, and Persuasion) teach students how scientific knowledge is created, disseminated, and accepted.

The setting in which the 3P's can be learned is the scientific practicum. Many Ph.D. students have trouble defining their research, which reflects a lack of previous educational experiences where they were responsible for setting their own research and learning agendas. To understand science as a process and be able to think critically about science, students need to learn by performing each of the steps in the scientific process.

A discussion of educational philosophy and goals is important because it plays a large role in how educational software is viewed and employed by instructors. The remainder of this article will explore using software to create scientific practica and some of the potential impacts of these practica on animal welfare.

Two kinds of software can be used in a scientific practicum. The first kind is the simulation, which is classically constructed with a mathematical model and used as an alternative laboratory. The second kind of software is the research tool. These programs are not simulations, but actual tools used by researchers. They can be used by teachers to create experimental settings using either student-collected or published data.

Computer simulations are well suited to creating scientific practica. They allow a student to do research, often "re-creating" classic experiments, without the time, cost, or animal usage involved in the original research. For example, a simulation of the cardiovascular system permits students to experiment on the heart without doing open-heart surgery. A good simulation provides the learner with a robust environment for exploration and experimentation. In the simulation the tools of the researcher are present so the student can ask and answer realistic questions. Many of the BioQUEST simulations employ a design where the solution to the problem is not known to either the teacher or the student. In this situation there can be no recourse to authority; the problem-solver must justify the solution on the basis of warranted inferences drawn from the data that has been collected.

It must be noted, however, that computer simulations are not a panacea. If the educational goal involves working with a living organism, the simulation--by its nature--may not be satisfactory. For example, finding a vein, taking a pulse and experiencing biologic variation may all be better served by working with living systems. If, however, the educational goal is abstract from the organism (*e.g.*, Mendelian genetics, protein purification), computer simulation provides a powerful alternative, in some cases arguably better than life itself. For example, experimental Mendelian genetics are commonly introduced with fruit flies in high schools and colleges. A computer can simulate this laboratory's topic--inheritance mechanisms--without waiting for gestation periods and with online statistical tools for quickly counting progeny and assessing hypotheses. While an alternative to breeding fruit flies may not be very important from an animal welfare standpoint, this alternative lab provides a more intense intellectual environment than its live counterpart.

Research and productivity software tools are also important ways of creating a scientific practicum. There are a wide variety of computer

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Reductions in Animal Use in Veterinary Medical Education

by
Franklin M. Loew
Tufts University School of Veterinary Medicine

In 1985, the Office of Technology Assessment (OTA) estimated that from 17 to 22 million animals were used in research and testing in the United States in 1983. In addition, animal use in medical and veterinary medical education amounted to at least 53,000 animals during the 1983 school year (1). To my knowledge, more recent data are not available.

The OTA report observed that, "Although far fewer animals are used in education than in either research or testing, animal use in the classroom plays an important role in shaping societal attitudes toward this subject." A 1988 report (2) by the National Research Council reiterated this by noting that "animal use in high schools and colleges might be most people's only contact with laboratory animals, [such use makes it] an important determinant of how the public feels about such use."

It is my sense that animal use in veterinary medical education has decreased over the past 5 years in the basic sciences and in clinical teaching. In physiology, pharmacology, and microbiology/immunology, techniques such as videotapes, interactive computer modules, and autotutorials have supplanted much live animal use. The reasons seem to be based more on the effectiveness of the learning/teaching interaction than on ethical or even cost considerations.

In clinical teaching, however, ethical concerns have caused about one-third of the Nation's schools and colleges of veterinary medicine to offer "alternative" programs in surgery for (mainly) third-year students. For veterinary students, the ethical issue of animals as both patients and experimental or educational subjects looms larger than for any other kind of student. The American Veterinary Medical Association's college accrediting body, the Council on Education, has discussed the issue (3), and at least one school's experience implementing such a program has been described (4).

There are educational, ethical, and in some cases, legal issues inherent in the evolution of teaching methods that rely less--or not at all--on live animals. My experience is that local curricular goals are more important than national ones in implementing new teaching and learning methods (5).

References

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Legislation Cont'd...

- **H.R. 2281 To amend the Public Health Service Act to revise and extend the programs of the National Institutes of Health, and for other purposes.**

Introduced May 9, 1991, by Henry Waxman (D-CA), and referred to the Committee on Energy and Commerce. This act may be cited as the "National Institutes of Health Revitalization Amendments of 1991." Title III, Section 302, discusses the use of animals in research. Previously introduced as H.R. 1532.

- **S. 1291 To amend title 35, United States Code, to impose a 5-year moratorium on the granting of patents on invertebrate or vertebrate animals, including those that have been genetically engineered, in order to provide time for Congress to fully assess, consider, and respond to the economic, environmental, and ethical issues raised by the patenting of such animals.**

Introduced June 13, 1991, by Mark Hatfield (R-OR), and referred to the Judiciary Committee.

- **H.R. 2041 To direct the Secretary of the department in which the Coast Guard is operating to conduct a study to develop methods and devices to protect manatees, and for other purposes.**

Introduced April 24, 1991, by Charles Bennett (D-FL) and referred to the Committee on Foreign Relations. This act may be cited as the "Manatee Protection Act of 1991."

- **S. 1219 To enhance the conservation of exotic wild birds.**

Introduced June 4, 1991, by Max Baucus (D-MT) and referred to the Committee on Environment and Public Works. No exotic birds may be taken from their natural habitats. Exotic birds in already in captivity must be marked.

Special Announcements...

AWIC Workshop

On May 22-23, 1991, AWIC held its first workshop on alternatives. The workshop was designed to assist persons with satisfying the requirements for searching for information on alternatives as defined under the animal welfare regulations. Ten people from local and out-of-State institutions attended the workshop held at the National Agricultural Library (NAL). Participants represented a variety of positions: information specialists, institutional animal care and use committee (IACUC) members, researchers, and research coordinators.

AWIC staff and key NAL personnel from the Document Delivery and Indexing Divisions gave lectures on the following topics: defining the 3 R's; AWIC's role and scope; the Animal Welfare Act; AWIC publications; database evaluation and searching; document delivery; primary investigator, IACUC and information provider responsibilities; security issues; and information technology. Jean Larson, Janice Swanson, Karen Clingerman, and D'Anna Berry of AWIC and Julie Mangin (Document Delivery) and Don Blamberg (Indexing) delivered the various presentations. Robyn Frank, Head of the Information Centers Branch, gave a welcome and opening comments.

Discussions of issues and problems facing the participants became an important part of the program. The exchange of ideas between the participants and the AWIC staff provided insight as to the current needs of the regulated research community.

Participants also engaged in hands-on exercises. The participants were divided into groups and assigned work problems which represented typical reference requests by primary investigators or IACUC's involved in satisfying compliance standards for alternatives. Each group developed strategies, performed searches using the information resources at AWIC (online database and CD-ROM searches, books, manuals, guides, *etc.*), and presented their results.

Overall, evaluations of the workshop were excellent. Participants indicated that the workshop should be continued and possibly taken "on the road" to institutions wishing to sponsor such an activity.

On July 2, 1991, a condensed version of the workshop was held at Emory University in Atlanta, Georgia. Investigators, IACUC members and the medical library staff (workshop sponsors) from Yerkes Regional Primate Center, the Veterans Administration Hospital, and campus research facilities were in attendance. Again, participants found the discussions educational and helpful in resolving problems associated with searching for information on alternatives.

If you would like to attend or sponsor the AWIC workshop, contact Jean Larson, Coordinator, at (301) 344-1215.

AWIC Wins Award

The Animal Welfare Information Center (AWIC) won the prestigious John Cotton Dana Award for "Outstanding Public Relations Among Special Libraries." The award is sponsored jointly by the H.W. Wilson Company and the American Libraries Association (ALA) Administration and Management Association, Public Relations Section. This international competition has been held continuously since 1946.

The citation reads "For a multifaceted public relations program to increase awareness and use of the Animal Welfare [Information] Center through effective outreach activities." Over 104 libraries and library systems submitted entries for this competition.

The award was presented on July 1, 1991, at a special reception (sponsored by H.W. Wilson Co. at the Ritz-Carlton Hotel) during the annual ALA meeting held in Atlanta, Georgia. Jean Larson, AWIC's coordinator and Dr. Janice Swanson, Technical Information Specialist, travelled to Atlanta to receive the award for the Center. Joseph Howard, Director; Keith Russell, Chief of the Public Services Division; and Robyn Frank, Head of the Information Centers Branch, of the National Agricultural Library, were present at the award ceremony.

Announcements...

• Contacting AWIC via INTERNET - User Name and Node: NALAWIC@ASRR.ARSUSDA.GOV

It is now possible to contact the Animal Welfare Information Center via INTERNET by sending messages using the user identification listed above.

• Call for Presenters - 6th International Conference on Human-Animal Interactions

The 6th International Conference on Human-Animal Interactions, "Animals & Us," will be held in Montreal, Canada on July 21-25, 1992. Submission of abstracts for audiovisual or oral presentations must be submitted by September 1, 1991.

Send abstracts originating in North America to: Animals & Us, 6th International Conference on Human-Animal Interactions, HABAC, P.O. Box 313, Station B, Ottawa, Ont., Canada K1P 6C4. Tel: (613) 747-1846.

Send abstracts originating outside North America to: Animals & Us, 6th International Conference on Human-Animal Interactions, AFIRAC..7, rue du Pasteur Wagner, 70411 Paris, France. Tel: (33) 1 48 060300.

• Call for Papers - First International Conference of Animal Health Information Specialists

The First International Conference of Animal Health Information Specialists will be held July 16-19, 1992, at the University of Reading, in Reading, England. The conference will be an important forum for librarians and other professionals working in fields such as veterinary medicine, laboratory animal science, zoological parks and wildlife parks, primatology, and zootechny. Deadline for submission of abstracts is October 1, 1991. Send abstracts to Vicky Croft, Veterinary Medical/Pharmacy Library, 170 Wegner Hall, Washington State University, Pullman, WA 99164-6512. Tel: (509) 335-5544.

• PRIMATE TALK - A discussion forum for primatology

The Wisconsin Regional Primate Research Center (WRPRC) at the University of Wisconsin has announced the availability of a new electronic mail listserver called PRIMATE-TALK. People with INTERNET, BITNET, or UUCP addresses can communicate with PRIMATE-TALK. If you are interested in joining PRIMATE-TALK, send a message to PRIMATE-TALK-REQUEST@PRIMATE.WISC.EDU stating that you would like to sign on. For more information contact Larry Jacobsen, Head of Library Services, WRPRC Library, 1220 Capitol Court, Madison, WI 53715-1299, Tel: (608) 263-3512.

• ICLAS News

The International Council for Laboratory Animal Science (ICLAS) has begun production of a bi-annual newsletter, which replaces the *ICLAS Bulletin*. *ICLAS news* will contain information concerning various aspects of laboratory animal science including meetings, courses and congresses. For more information about the newslettter and ICLAS contact Osmo Hanninen, Secretary General of ICLAS, Dept. of Physiology, University of Kuopio, Finland, Tel: +358-71-163 080 and 163 110.

• Hildegard Doerenkamp and Gerhard Zbinden Foundation for Realistic Animal Protection in Scientific Research - Scientific Award 1992

A prize of 50,000 deutsche marks will be awarded for outstanding scientific contributions leading to the reduction, refinement, or replacement of animal use in biomedical research or testing. The topic for the 1992 award is "Reducing or Replacing Animals' Use in Immunology, Allergy and Transplantation Research: Application of Modern Data Processing Concepts, Development of In Vitro Models and Standardization of Alternative Techniques." Applications may consist of published or unpublished reports or self-explanatory audiovisual presentations. No special application forms are required. The jury reserves the right to split the prize among not more than three applicants. Deadline for submission is January 31, 1993. Applications should be sent to:

Dr. med. vet. A. Steiger
Bundesamt fur Veterinarwesen
Schwarzenburgstrasse 151
CH-3097 Liebefeld
Switzerland

Correction: The monetary award amount for the Hildegard Doerenkamp and Gerhard Zbinden Scientific Award for 1991 announced in this newsletter in vol. 2 no. 1 January-March 1991 was incorrectly printed as 5,000 deutsche marks. The correct amount is 50,000 deutsche marks.

Software Cont'd...

tools used by biomedical researchers that can be directly employed to set practicum problems for students at all levels. Statistics software, especially programs designed for exploratory data analysis, are well suited for learning both practical and theoretical statistics. There are three-dimensional molecular modeling programs, tools for cladistic analysis, and many other professional tools that bring research problems into learning settings.

The biggest challenge for educators seeking life-science software is not technologic but bibliographic. At present there is no well-established "publishing" for educational simulations. Articles describing innovations appear in journals of research societies, but they often describe a prototype that is not in distribution. Large hardware vendors, especially Apple and IBM, collect catalogs of unreviewed items. The education sections of some research societies are beginning to catalog and peer-review software, but typically each teacher must seek and review software individually.

Two future directions for alternative practica using computers deserve mention. The first direction is practica that depend on extremely large data sets. Present floppy and hard-disk technology makes it difficult to provide students with realistic data sets in some domains. For example, audio (bird songs, heart sounds) or visual (pathology slides, x-ray crystallography) data requires large amounts of storage space. Compact Disc-Read Only Memory (CD-ROM) and laser discs are rapidly becoming available as affordable data sources.

The second direction is the combination of physical simulators with computerized ones. An example is Resuci-Anne (a physical simulator) equipped with internal instrumentation and a computer to provide students with better feedback on their efforts. There are now realistic physical simulations of limbs in which students can break and set bones. The simulated bones and tissues have realistic physical properties. Building on that success, a simulated thorax is being designed that promises to become a "flight simulator" for some surgical practica. The kind of physical-computer hybrid simulation will capture both the tactile aspects important to surgery practica and the physiological aspects important to managing a patient during an operation.

In summary, I have argued that the fundamental issue in discussing computers in education and their impact on animal welfare is a philosophy of education. The philosophy presented here views the student as a novice scientist working in a scientific practicum. Within this philosophic framework, a number of advances are being made to improve biology and medical education with computers and simultaneously reduce the use of animals in education.

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Upcoming Meetings...

American Veterinary Medical Association (AVMA), July 27-31, 1991. Seattle, WA. Contact: (708) 605-8070.

National Livestock, Poultry and Aquaculture Waste Management Workshop, July 29-31, 1991. Kansas City, MO. Contact: (202) 447-4487 or (301) 443-0830.

Society for the Study of Reproduction Annual Meeting, July 29-31, 1991. University of British Columbia, Vancouver, Canada. Contact: (217) 356-3182.

American Institute of Biological Sciences (AIBS) Annual Meeting, August 4-8, 1991. San Antonio, TX. Contact: (202) 628-1500 or 1-800-992-2427.

Third IBRO World Congress of Neuroscience, August 4-9, 1991. Montreal, Canada. Contact: (201) 532-9400

American Society of Animal Science (ASAS) Annual Meeting, August 6-9, 1991. Laramie, WY. Contact: (217) 356-3182.

American Psychological Association, August 6-12, 1991. San Francisco, CA. Contact: (703) 247-7803.

American Dairy Science Association (ADSA) Meeting, August 12-15, 1991. Logan, UT. Contact: (217) 356-3182.

22nd International Ethological Conference, August 22-29, 1991. Kyoto, Japan. Contact: +81-3-586-8691.

4th International Congress of Veterinary Anaesthesia, August 25-30, 1991. Utrecht, The Netherlands. Contact: 31-30 531337.

National Institutes of Health (NIH)/U.S. Department of Agriculture (USDA) Workshop "The Humane Care and Use of Laboratory Animals: Resolving the Ethical Dilemmas in Animal Use Protocol Review; How to Increase Humaneness Without Weakening the Science," September 12-13, 1991. Seattle, WA. Contact: (206) 543-9678.

American Association of Bovine Practitioners, September 18-21, 1991. Orlando, FL. Contact: (802) 476-6555.

American Association of Zoo Veterinarians, September 28-October 3, 1991. Calgary, Canada. Contact: (404) 727-7428.

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Alternatives Cont'd...

Alternatives differ in a significant way from the usual scientific search for new techniques because they require that the use of animals or animal pain and distress be reduced as a result of their implementation. Given the current state of our knowledge, it would be ridiculous to argue that the present rate of advance in the development of biomedical knowledge could be maintained without animal research. But today's refinement may be replaced tomorrow by a new technique that uses no animals. And the development of new research techniques that have also allowed us to reduce the use of laboratory animals in research or the distress caused them has been an important element in the current success of biomedical research. For example, in the development of the polio vaccine, the Nobel prize was awarded to the authors of 1949 cell culture paper. Techniques of human and animal cell culture have been enormously improved since then, and the range of questions that can be investigated and answered in cell culture has expanded commensurately.

A powerful and convincing argument can be made that the development of new research techniques (*e.g.*, paper chromatography, radioimmunoassay, monoclonal antibody production, genetic engineering, polymerase chain reaction, and positron emission tomography, to name a few) has been a critical factor behind rapid advances in biomedical knowledge. Since an alternative is nothing more than a new technique that also happens to lead to reduced animal use and/or distress, I find it hard to see how the pursuit of alternatives could be inimical to science. Toxicologists have begun to embrace the alternatives concept in the last few years, but many other branches of science avoid the issue as much as possible despite considerable public and congressional pressure to do something about "alternatives."

Part of the resistance to the issue of alternatives is the common misunderstanding that the term refers only to replacement. At a talk I gave, I was once introduced as an expert on alternatives. The moderator proceeded to define the term as referring to the three R's and then stated that, although there are a number of alternatives in toxicology, there are none available in cardiovascular or behavioral research. The moderator had fallen into the classic error of defining the term as the three R's and then thinking only in terms of one R, replacement. There are clearly opportunities to explore reduction and refinement in cardiovascular and behavioral research.

When principle investigators (PI) search for documentation that they have considered but rejected as alternatives, they should consider whether their use of new anesthesia and post-operative husbandry techniques may be identified as an alternative. IACUC's and PI's must incorporate not just replacement but also reduction and refinement into their planning and consideration of animal research protocols.

It is obvious to anyone who is able to step back from the laboratory bench and review the public's attitudes toward science that there is concern, not just about animal abuse, but also about any use of animals. In the 1960's, a scientist could feel like a public hero. Today, he or she may be made to feel like a criminal. In the last 10 years, the membership of animal protection groups has increased fivefold to tenfold. Symbols of public concern for animals are widespread throughout popular culture. Even Superman has been drawn into the animal research controversy. In a recent issue of the comic book, Lois Lane exposed a callous biomedical researcher, and Superman had to subdue the monstrous ape resulting from the research, if possible, without killing it!

The public wants alternatives developed and promoted. Scientists can satisfy these public concerns without compromising the quality of their research. To continue the polarized argument about whether or not animals are needed in research is unproductive. Scientists can show the public that they are greatly concerned about research animal use and distress by instituting and publicizing programs that actively seek ways to reduce animal use and distress, and increase the well-being of laboratory animals.

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AWIC User Tips...

Resources for Information on Alternatives and Animal Welfare

The 1985 amendments to the Animal Welfare Act and the resulting regulations require that the primary investigator consider alternatives when submitting a research protocol to the Animal Care and Use Committee. While the Animal Welfare Information Center is stated as a source for information on alternatives, there are other resources available to aid the regulated community in complying with the regulations. The following list, which contains contact information for several of these organizations, has been reproduced from an AWIC Fact Sheet. Copies of this Fact Sheet are available from AWIC.

Animal Welfare Information Center (AWIC)
National Agricultural Library
Room 205
Beltsville, MD 20705-2351
301-344-3212 Fax: 301-344-5472

Animal Welfare Institute (AWI)
P.O. Box 3650
Washington, DC 20007
202-337-2332 Fax: 202-338-9478

Applied Research Ethics National Association (ARENA)
132 Boylston Street - 4th Floor
Boston, MA 02116
518-442-3510 Fax: 518-442-3560

Canadian Council on Animal Care
151 Slater
Ottawa, Ontario K1P 5H3 Canada
613-238-4031 Fax: 613-238-2837

Center for Alternatives to Animal Testing (CAAT)
Johns Hopkins School of Public Health
615 N. Wolfe Street
Baltimore, MD 21205
301-955-3343 Fax: 301-955-0258

Center for Animals and Public Policy
Tufts University
200 Westboro Road
North Grafton, MA 01535
508-839-5302 extension: 4750 Fax: 508-839-2953

Commission on Life Sciences
Institute for Laboratory Animal Resources (ILAR)
2100 Constitution Avenue
Washington, DC 20418
202-334-2590

Hastings Center
255 Elm Road
Briarcliff Manor, NY 10510
914-762-8500 Fax: 914-762-2124

J.F. Morgan Foundation
Health and Welfare Canada
Tunneys Pasture
Ottawa K1A OL2 Canada
613-957-2399 Fax: 613-957-1907

National Institutes of Health
National Library of Medicine
Bethesda, MD 20894
301-496-3147 Fax: 301-480-3537

Public Responsibility in Medicine and Research (PRIM&R)
132 Boylston Street - 4th Floor
Boston, MA 02116
617-423-4112

Scientists Center for Animal Welfare (SCAW)
4805 St. Elmo Avenue
Bethesda, MD 20814
301-654-6390

Upcoming Meetings Cont'd...

Animal Transportation Association, September 29-October 2, 1991. Minneapolis, MN. Contact: (214) 713-9954.

International Biotechnology Expo & Scientific Conference (IBEX '91), October 6-8, 1991. San Francisco, CA. Contact: (415) 508-0118.

Scientists Center for Animal Welfare (SCAW), "Humane Aspects of Primate Models in Neurological Disorders," October 11, 1991. Bethesda, MD. Contact: (301) 907-3993.

Scientists Center for Animal Welfare (SCAW), "U.S. Regulations and Canadian Guidelines for Research Animal Welfare," October 20, 1991. Vancouver, Canada. Contact: (301) 654-6390.

NEW PUBLICATIONS AND UPDATES...

- *Audio-Visuals Relating to Animal Care, Use and Welfare* AWIC Series #7 (Updates AWIC Series #3 June 1990)
- *Laboratory Animal Facilities and Management* QB 91-43 (Updates QB 90-55)
- *Animal Models of Disease* QB 91-42 (Updates QB 90-09)
- *Animal Welfare Legislation and Regulations* QB 91-63 (Updates QB 90-20)
- *BST - Bovine Somatotropin/ Growth Hormone* QB 91-75 (Updates QB 90-16)
- *PST - Porcine Growth Hormone* QB 91-73 (Updates QB 89-29)
- *Animal Models in Biomedical Research: Swine* SRB 91-06
- *Information Resources for Environmental Enrichment of Primates: 1987-1990* (National Agricultural Library/National Library of Medicine/Office for Protection from Research Risks)
- *Animal Welfare Legislation: Bills submitted into the 102nd Congress, January - March 1991* AWIC Series #9 (Preliminary Report #1)
- *Animal Welfare Legislation: Bills and Public Laws, 1980 - 1988* AWIC Series #8 October 1988 (Rev. May 1991)

United States Department of Agriculture
National Agricultural Library
Newsletter Staff, Room 205
Beltsville, MD 20705

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